

MALTA FEVER

COLONEL DAVID BRUCE

HYGIENE & DISEASES OF WARM CLIMATES

EDITED BY ANDREW DAVIDSON

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OF

WARM CLIMATES.

EDITED BY

ANDREW DAVIDSON, M.D., F.R.C.P.Ed.,

LATE VISITING AND SUPERINTENDING SURGEON, CIVIL HOSPITAL, AND PROFESSOR OF CHEMISTRY,
ROYAL COLLEGE, MAURITIUS; AUTHOR OF "GEOGRAPHICAL PATHOLOGY."

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CHAPTER VI.

MALTA FEVER.

BY SURGEON-CAPTAIN DAVID BRUCE, M.B., ARMY MEDICAL STAFF.

Synonyms.—Mediterranean fever (various writers); Gastric remittent and Bilious remittent fever (Marston, 1861); Mediterranean gastric remittent fever (Chatres, 1865; Boileau, 1866); La febbre gastro-biliosa (Gulia, 1871); Fæco-malarial fever (Donaldson, 1876); Intermittent typhoid (Borrelli, 1877); Adeno-typhoid (Cantani); Febris complicata (Veale, 1879); Febris sudoralis (Tomasselli, 1880); Pythogenic septicæmia (Moffet, 1889); Rock fever, Neapolitan fever, etc.

Definition.—A disease of long duration, characterised by fever, profuse perspiration, constipation, relapses almost invariable, often accompanied or followed by pains of a rheumatic or neuralgic character, sometimes swelling of joints or orchitis. On post-mortem examination enlargement and softening of spleen, congestion of the various organs, no enlargement or ulceration of Peyer's or other intestinal glands, and the constant occurrence in various tissues of a definite species of micro-organism.

Geographical Distribution.—This fever, which does not appear to occur in England, has a wide distribution along the shores and among the islands of the Mediterranean. That the fever as it occurs in Malta is identical with the so-called Rock fever of Gibraltar, there can be no doubt, ample opportunity having been afforded at the Royal Victoria Hospital, Netley, of comparing cases from both places. I have also had the opportunity of studying in the Naval Hospital, Malta, cases of fever contracted in many of the Mediterranean harbours visited by the British fleet, and have completely convinced myself of their identity with the disease under consideration.

In Italy it has been described as occurring at Naples and other towns along the coast. Cagliari in Sardinia, Catania in Sicily,



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Candia in Crete, may also be mentioned as towns in which this fever appears to be endemic.

On further investigation, and when the characters and specificity of this form of fever are better recognised, I have no doubt the area of its distribution will be much extended, and many cases at present confounded with typhoid and malarial fevers found to be identical with it.

Etiology.—1. *Bacteriology.*—Like typhoid and other infectious diseases, Malta fever is due to the introduction into the system of a specific poison, which, until within the last few years, has been generally looked upon as arising directly from the decomposition of animal and vegetable matters in places where insanitary conditions prevail. An intermediate stage in the causation of such infectious diseases is now recognised in the presence of micro-organisms which are supposed to be evolved by the insanitary conditions, and in their turn to give rise to disease. The micro-organism associated with Malta fever was first described in 1887, and for want of a better name is called the micrococcus of Malta fever; and as its demonstration is very valuable as a means of diagnosis, I shall now proceed to describe how it may be obtained, and what are its morphological and cultural characters.

Unhappily for practical purposes it is difficult to demonstrate its presence during life, as it has not been found in the circulating blood.

The organ in which it occurs in greatest numbers is the spleen; and it is only by withdrawing a small quantity of splenic blood or pulp, by means of a sterilised hypodermic needle, that its presence during life has, up to the present, been proved.

In fatal cases, however, the micrococcus is readily obtained from the spleen by means of cultivation on suitable media.

This organ ought to be removed from the body as soon as possible after death, protected from contamination by being wrapped in a cloth saturated with a solution of corrosive sublimate (1 in 1000), and taken to a room set apart as a laboratory. In transferring traces of the splenic pulp to tubes containing the nutrient material, certain precautions should be taken. Three extensive cuts, the second in a plane at right angles to the first, and the third at right angles to the second and parallel to the first, are made by three knives previously thoroughly sterilised by heat. A platinum needle heated to redness before each inoculation is then used to convey a small portion of the pulp from the depths of the third cut to the solid nutrient jelly. The test tubes containing the inoculated medium should then be placed in an incubator, so as to keep them

different. At the end of nine or ten days, if kept at 37° C., some of the colonies are as large as No. 4 shot. They are round in shape, with an even contour, slightly raised above the surface of the agar-agar, and smooth and shining in appearance. On holding up the tube and examining such colonies by transmitted light, the centre of each is seen to be yellowish in colour, while the periphery appears bluish-white. On looking at the same colonies by reflected light no appearance of yellow can be seen, they then simply appear to be milky white in colour. The separate colonies on the surface of the agar-agar do not extend indefinitely, and after a couple of months are found to be no larger than hemp seeds.

The time which elapses before the colonies of this micrococcus can be seen by the naked eye on the surface of the agar-agar is fairly constant; kept at a temperature of 25° C., this period may be stated to be seven days; at 37° C., about half that time. When stab cultivations are made into 10 per cent. nutrient gelatine, and kept at 22° C., little or no growth takes place; after a month the needle track has become slightly developed, and on the surface can sometimes be seen a minute smooth white growth not larger than a pin-head. No liquefaction of the gelatine takes place.

I have not succeeded in making plate cultivations of this species on account of the extreme slowness of its growth at the temperature at which this medium remains solid.

Planted on boiled potato and kept at blood temperature, no apparent growth takes place.

I shall now state briefly the result of experiments on the transmission of Malta fever to animals by the inoculation of pure cultures of the micrococcus.

Up to the present the only animal found susceptible to the disease is the monkey, the animals commonly employed for such experiments, as mice, guinea-pigs, and rabbits, having proved insusceptible.

The species of monkey with which successful results have been obtained is that known as the Bonnet Monkey, and the material used for inoculation has been a portion of a colony removed from an agar-agar tube by means of a sterilised platinum needle, and rubbed up in a small quantity of distilled water or nutrient broth. This is injected into the subcutaneous tissue of the monkey by means of a sterilised hypodermic needle after the part has been shaved and thoroughly cleansed.

Monkeys inoculated in this way rapidly develop febrile symptoms with high temperature, and, as a rule, die in from thirteen to twenty days.

The pathological changes on post-mortem examination are similar to those which occur in man; and cultivations made from the various organs reveal the presence of the micrococcus of Malta fever in a state of pure culture.

In regard to the important question as to how this micro-organism gains access to the human subject, whether by the air, in the drinking water, or in the food, absolutely nothing is known up to the present; and on account of the high temperature required for its growth, the length of time which elapses before the colonies appear, and the absence of any well-marked morphological or cultural characteristics, the search for it outside the body will be very difficult, if not impossible.

2. *Age and Sex.*—As the great majority of the English soldiers stationed at Malta are young men, statistics in regard to age are of little value. I may, however, state that sex seems to have little or no influence, and that youth, as is natural, is a predisposing factor. If the disease occurs among the very young, it is difficult to be certain of the diagnosis, and it is probably often overlooked. The opinion of the native practitioners is that the greatest number of cases occur between the age of 6 to 30, less frequently from 2 to 6 and from 30 to 50, and very rarely above 50. This may be true for the native population who live all their lives in the infective area, without being true for strangers arriving there. In my opinion, given a susceptible constitution, any age is liable to this fever, but that from a variety of reasons the liability is exaggerated in those under 35.

3. *Mode of Prevalence.*—In Malta this fever is endemic, and never altogether absent; but now and then the cases become so numerous as to constitute epidemics. Some of these outbreaks have been attributed to the general immaturity and want of acclimatisation of the men of some regiments landing from England during the unhealthy season; in others, the cause has been assigned to the insanitary condition of certain of the barracks. Be this as it may, it is also certain that Malta fever attacks officers and their families living in large, well-ventilated houses probably in as large a proportion as it does soldiers in the more crowded barrack-rooms.

4. *Months and Seasons.*—In regard to the months and seasons in which Malta fever is most prevalent, the following chart (Fig. 31) represents the number of cases admitted during each month for eleven years from a garrison of some 3000 soldiers. For the sake of comparison, the admissions for enteric fever during the same period are represented by a dotted line. From these it will be seen that

Malta fever is a disease of summer, most cases occurring in July, whereas enteric fever is a disease of autumn and early winter.

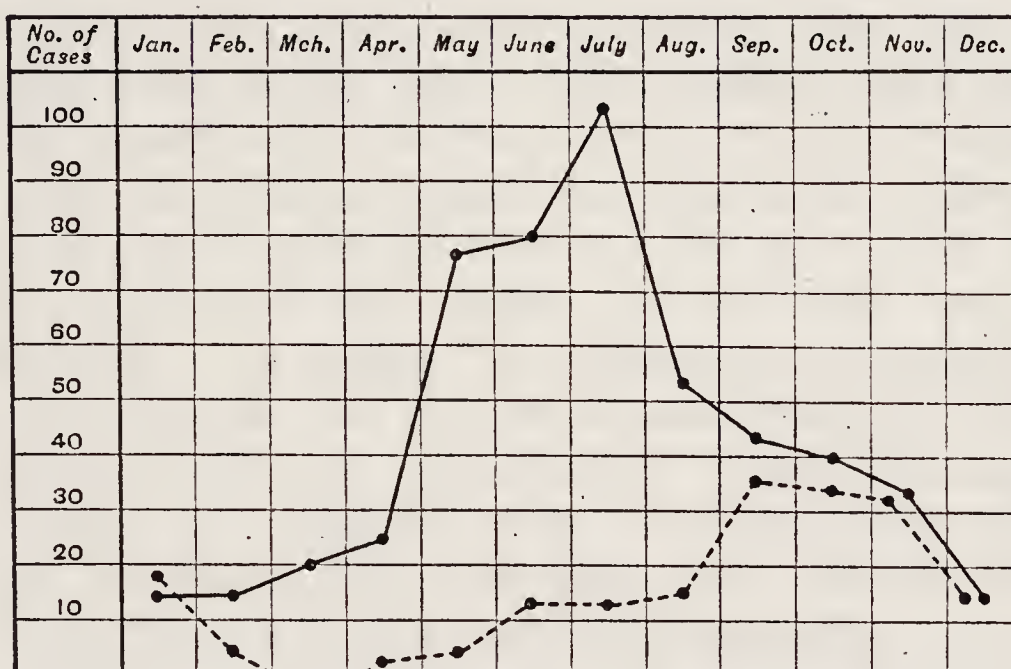


FIG. 31.

5. *Mode of Dissemination.*—Malta fever is never, as far as I know, transmitted directly from person to person. In the hospitals in Malta, although cases are to be found all the year round scattered through the various wards, there is no evidence that it has been communicated to any of the other patients in a single instance. As I have before stated, it is impossible with our present knowledge to say whether the poison gains entrance to the organism by the respiratory or alimentary organs. The tendency is to believe that it floats in the air, especially in the neighbourhood of foul drains or other insanitary conditions, and so reaches the body by being breathed in. A bad smell, *per se*, cannot give rise to a specific fever, although it may lower the general health and so predispose to disease.

Since this fever is caused by a definite vegetable organism, it is difficult to picture such a particle rising into the air from fluid or solid substances in which it may be supposed to find a suitable soil for growth. On this account it is probable that Malta fever, like typhoid, is chiefly carried by means of the drinking water or other fluid or solid foods to which the contagium has gained access.

6. *Incubation.*—It is impossible to state definitely how long the period of incubation is, but it ranges probably from a few days to twenty or thirty. In an epidemic which broke out in the Verdala barracks in Malta, the first cases occurred six days after the arrival of the regiment. Again, instances are on record in which the disease has broken out in individuals on their arrival in England, fourteen and seventeen days after leaving Malta. But the important

point to note in this regard is, that there is no evidence to show that this period of latency is much longer than above stated, so that individuals who remain free from the fever for, say two months after leaving the infective area, may be considered safe from attack.

7. *Immunity from Second Attack.*—Some writers state that this disease is often manifested more than once in the same individual; and in the navy this opinion is held so strongly that officers and men who have once had Malta fever are not sent back to this station until a long time has elapsed. So far from one attack granting immunity, it is believed to predispose very strongly to a second and third attack. In a fever of such indefinite duration, cases of which may last two years, there is always the danger of mistaking a relapse for a separate attack. My experience leads me to the general conclusion that, as in many other infective diseases, one attack of this fever does as a rule confer immunity.

8. *Duration of the Fever.*—Soldiers show an average stay in hospital of nearly ninety days; but the length of the fever varies between very wide limits in different individuals. While some return to duty after twenty or thirty days, others again remain in hospital for as many weeks or more. One case which came under my observation was admitted to hospital in July, and with the exception of February and March he was in hospital suffering from this fever and its sequelæ until the end of the following year.

9. *Rate of Mortality.*—Not the least extraordinary feature of this fever is its low death-rate. From the result of my observations, I would put it as low as 2 per cent., which is very different from that which obtains in typhoid fever,

Clinical Description.—*Early Symptoms.*—A patient suffering from the fever, on being admitted to the hospital is usually loth to give any information in regard to his symptoms. By dint of patience you draw out of him that he has been feeling out of sorts for a week or two; he has had no interest in life; his appetite has been fickle; vague feelings of discomfort, as shivering, sickness, headache, and pains in his bones, have often been present, and to escape his now irksome and wearisome duties he has sought admission to hospital. For the first week or ten days he often suffers from sleeplessness and headache, which may vary from the mildest form to the most intense, very often frontal, and more rarely shooting from the occiput through the eyes. In these severe cases the face is usually congested, the anterior temporal arteries are seen pulsating, the ears are ringing, and epistaxis may occur. The tongue is usually covered with a thin yellowish-white fur; it is large and flabby, the edges and tip are red, and it is usually marked

laterally by the teeth. Congestion of the pharynx is often present. The appetite is absent; there is nausea, sometimes causing vomiting, and a feeling of weight and tenderness in the epigastric region. The bowels are constipated, as a rule, but errors in diet or excessive use of medicines may bring on attacks of diarrhoea. The stools are often streaked with blood. The spleen and liver are enlarged, and both may be tender on pressure. Tympanitis is uncommon, but may occur, as also may gurgling in the iliac fossa. During this time almost invariably a slight cough, with scanty expectoration, is developed; and on examination the breathing at the bases is found to be unsatisfactory, harsh, and creaking in character, with now and then a moist crepitation. Morning after morning you look in vain for rose-coloured spots on the abdomen, but you find that the patient is bathed in a most profuse perspiration, and a more or less abundant crop of sudamina is developed. He may have had a little delirium at night during this time; but this is rare, and is so slight as scarcely to call for remark. Unless there is severe headache or pain in the lumbar region, the patient during the first week or two usually professes that he suffers very little. At the end of this period the headache and acute symptoms usually disappear, and the long and monotonous period of the fever begins, a period which seems interminable alike to medical officer and patient. The patient's aspect is natural, but listless; his tongue is clean; he has a wish for solid food, which must often be denied, and his bowels require the stimulus of an aperient or enema for evacuation.

Later Symptoms.—The profuse perspiration still continues, and day after day he becomes weaker and loses weight, until he has scarcely power to stagger a few yards. His red blood corpuscles diminish in number, and his complexion changes from pale to sallow, and from sallow to dull clay colour. During this period his temperature often ranges high, but he professes to be quite unconscious of any change in his condition. He sleeps moderately well, has no delirium nor restlessness, is uncomplaining, and takes without any ill effect a large supply of fluid food and stimulants. The only variety in his condition is afforded by a rheumatic affection of the joints; one day it is his knee which is red, swollen, and intensely painful on being touched; a few days after it is a swollen and deformed wrist which he holds up for commiseration. Sometimes almost every joint in his body is attacked in this manner, or he may have intercostal neuralgia, sciatica, or an inflamed and swollen testicle. In this way many weeks are long drawn out; but at last his temperature fairly comes down to the normal, and he begins very slowly to improve, his blood corpuscles gradually regain their

normal number, his weight increases, and his strength is slowly restored. This is a clinical picture of an ordinary well-marked case; but the fever may occur in such a mild degree that the rise in temperature is the only morbid phenomenon. On the other hand, it may be so severe as to be absolutely indistinguishable from the most rapidly fatal case of typhoid.

Principal Symptoms in Detail. — *Physiognomy.* — The expression of the face, in the great majority of cases, may be summed up as being dull, listless, apathetic, anæmic. During the first onset, when there is severe headache, the face and exposed mucous surfaces are often congested, and the patient has an excited, restless look; but this soon disappears, and is replaced by lethargy. In long and severe cases, the face may become of a dull clay colour; and as the patient in this condition has left all hope behind, his expression is naturally despondent in the extreme.

Alimentary System. — The tongue is at first more or less thickly covered with grey or yellowish-grey fur; afterwards, as a rule, it is large, flabby, indented by the teeth, and covered with a thin translucent fur, except the tip and edges, which are red. In about 10 per cent. of the cases, the tongue becomes dry and brown for some days during the progress of the disease, and in a few the dorsum becomes fissured, with a little blood oozing from the fissures. In many cases the gums, as the disease advances, are found to be soft and spongy, and in some cases bleeding from the gums is noted. The fauces are usually somewhat congested. Vomiting, except in severe attacks of this fever, is not a marked symptom; but when this occurs the vomited matter is frequently streaked with blood. Nausea is much more commonly complained of than vomiting; and, as is natural, anorexia is almost invariably present at the beginning of the fever. Constipation is one of the marked features of this disease. In 65 cases in which the condition of the bowels was carefully noted, in 48 there was constipation throughout, and in 17 only did diarrhœa occur at any time during the illness. Murchison states that he noted constipation in 4 and diarrhœa in 93 out of 100 cases of enteric fever. It is evident in Malta fever that constipation is the rule and diarrhœa the exception. The reason of this is not far to seek. In post-mortem examinations of cases of enteric fever, ulceration and an inflamed condition of the lower end of the small intestine are found, which must necessarily have tended to diarrhœa; while in Malta fever no such ulceration or inflammation occur. Tympanitis is rare, and ascites still more so. The liver is usually slightly enlarged, sometimes painful on pressure, and slight jaundice may be noted occasionally.

Respiratory System.—Epistaxis occurs in about one-sixth of the cases. Cough at one time or another almost always occurs, and is marked in one half the cases; in these the expectoration is sometimes profuse, and is often streaked with blood. Even when there is no cough the breathing is found to be unsatisfactory, and on auscultation the respiratory sounds are harsh and bronchitic. Not uncommonly slight touches of pleurisy are experienced in the severe and protracted cases. Dyspnoea may be noted, and often without any grave condition being found on physical examination to account for it. Pneumonic consolidation is rare, not occurring in more than 2 per cent. of cases.

Circulatory System.—Palpitation of the heart becomes developed in many. The pulse may be said to range between 70 and 120. During the first period of the disease, although the temperature may range high, the pulse is frequently found to remain low, 80 to 90. As the fever progresses, and the heart becomes weakened, it rapidly increases, so that about the fortieth or fiftieth day 110 or 120 beats per minute are often registered. The highest pulse rate I have noted in a non-fatal case was 132 on the seventy-eighth day of disease.

Blood and Blood Glands.—Only in rare cases are particles of pigment to be seen on examining the blood with the microscope. The red blood corpuscles, as a rule, fall from 5,000,000 per cubic millimetre to about 3,500,000. The white blood corpuscles in most cases are found to be normal in number. The spleen is always enlarged, frequently painful on pressure, and in a few cases severe pain is complained of in this region.

The Temperature.—On looking over a series of temperature charts of this fever, the first thing which strikes one is their extreme irregularity.

It is also seen that in the great majority of cases this fever belongs to the continued type, the difference between the morning and evening temperatures being only from one to two degrees; but in a few cases there is seen a tendency in the fever to assume a remittent or even intermittent type, the temperature being normal, or slightly above normal, in the morning, and rising to 104° or 105° F. in the afternoon.

Mild uncomplicated cases show a curve touching 103° or 104° F. during the first week or ten days, and gradually sinking down to normal limits from the fifteenth to the twentieth day, when convalescence begins and recovery is uninterrupted.

But in ordinary typical cases of this fever the course is much less satisfactory, as will be seen by the following chart (Fig. 32), which

shows the long course of the fever, and the relapses which occur so frequently in this disease.

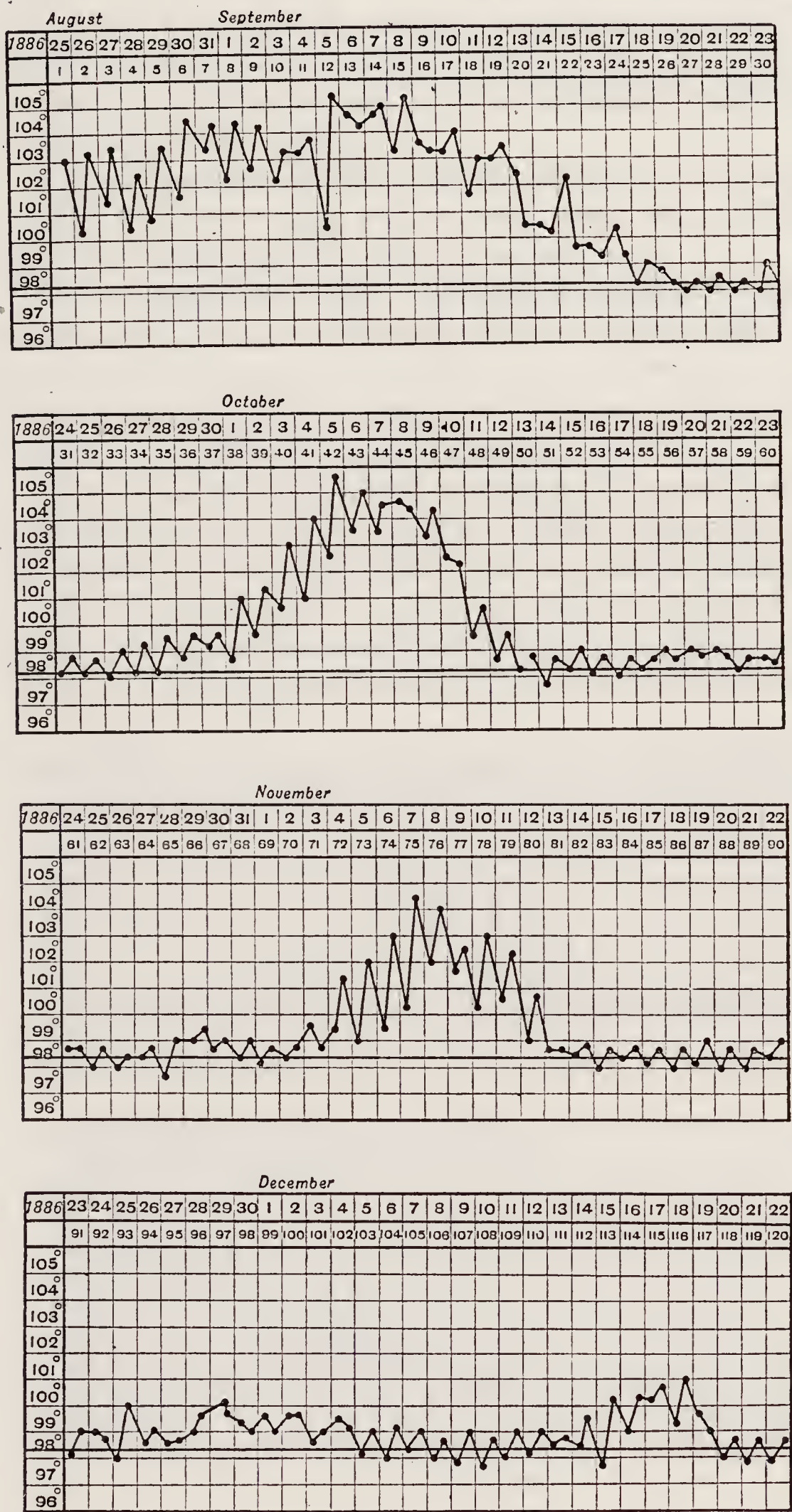


FIG. 32.

The first wave of temperature is seen in the foregoing chart (Fig. 32) to rise to $105^{\circ}4$ F., and then to sink gradually down to the normal line, which is reached about the twenty-sixth day. Then follows a week or ten days of apyrexia, followed by a second wave, the crest of which touches $105^{\circ}6$ F., and which constitutes a relapse lasting some sixteen days.

The temperature again remains normal, or only slightly above normal, for three weeks, when a third wave occurs, which is shorter than the foregoing, and only rises to $104^{\circ}5$ F.

The temperature after this second relapse is still not quite satisfactory, having a tendency to rise slightly above the normal line, and there is seen an attempt at the formation of a fourth wave between the 112th and 118th day of disease, which, however, proves abortive, the temperature only rising to 101° F.

After this the temperature remains quite normal, and the patient, although still weak and anæmic, is shortly afterwards sent back to his regiment to be employed for the first month on light duty.

That these secondary waves or relapses may persist for a very long time is shown by the next chart (Fig. 33), on which two are represented as occurring between the 115th and 160th day of the disease.

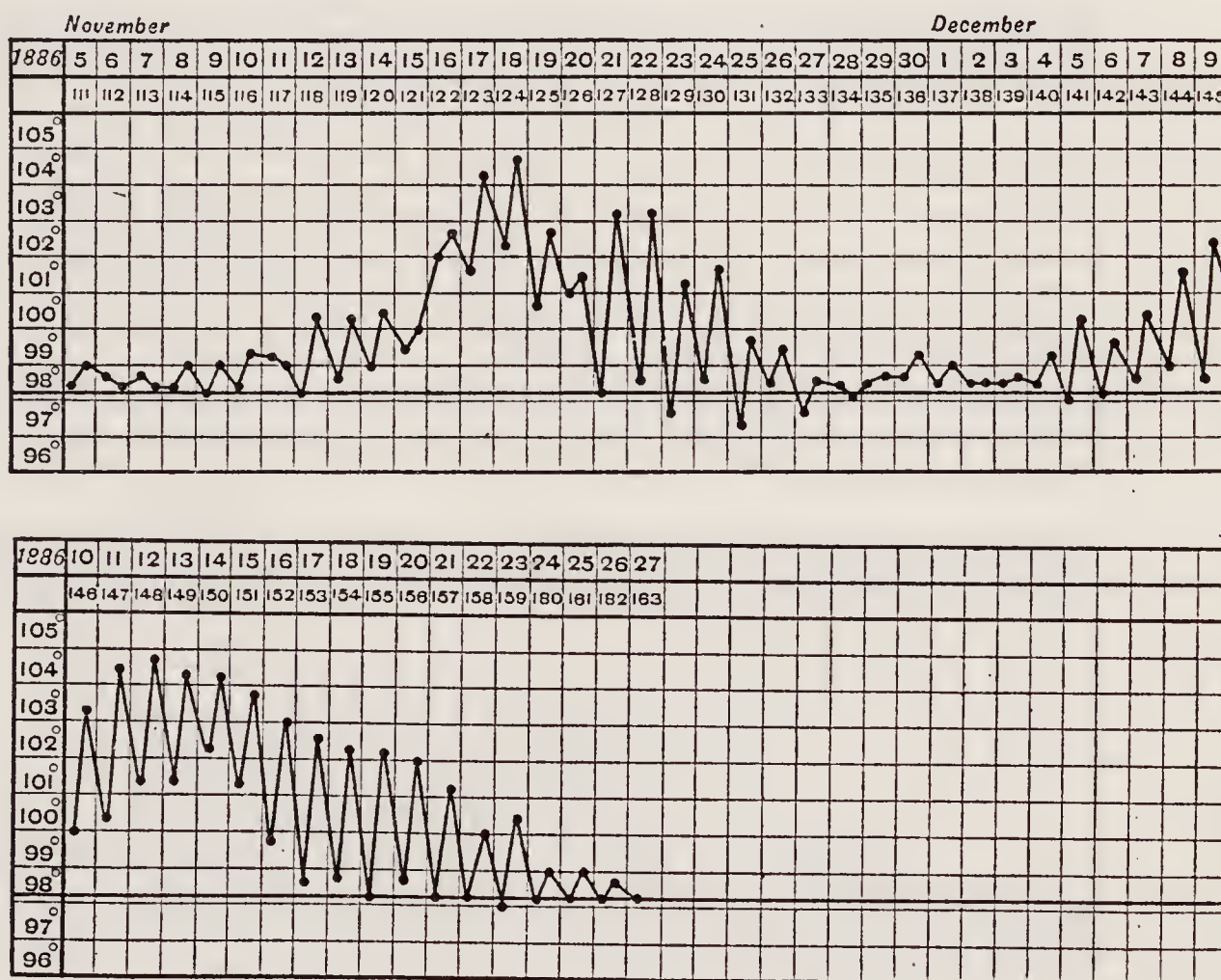


FIG. 33.

Although there is a marked tendency in the temperature curve of Malta fever to exhibit an undulatory course such as has been repre-

sented, nevertheless few cases occur in which the waves are separated by such regular periods of apyrexia.

In most cases the temperature remains a degree or two above the normal between the different recrudescences, and in many the fever is so irregular as to partially or completely mask the wave-like character.

Such an irregular case is presented in the following chart (Fig. 34), in which the temperature only fairly reaches the normal limits by the 100th day.

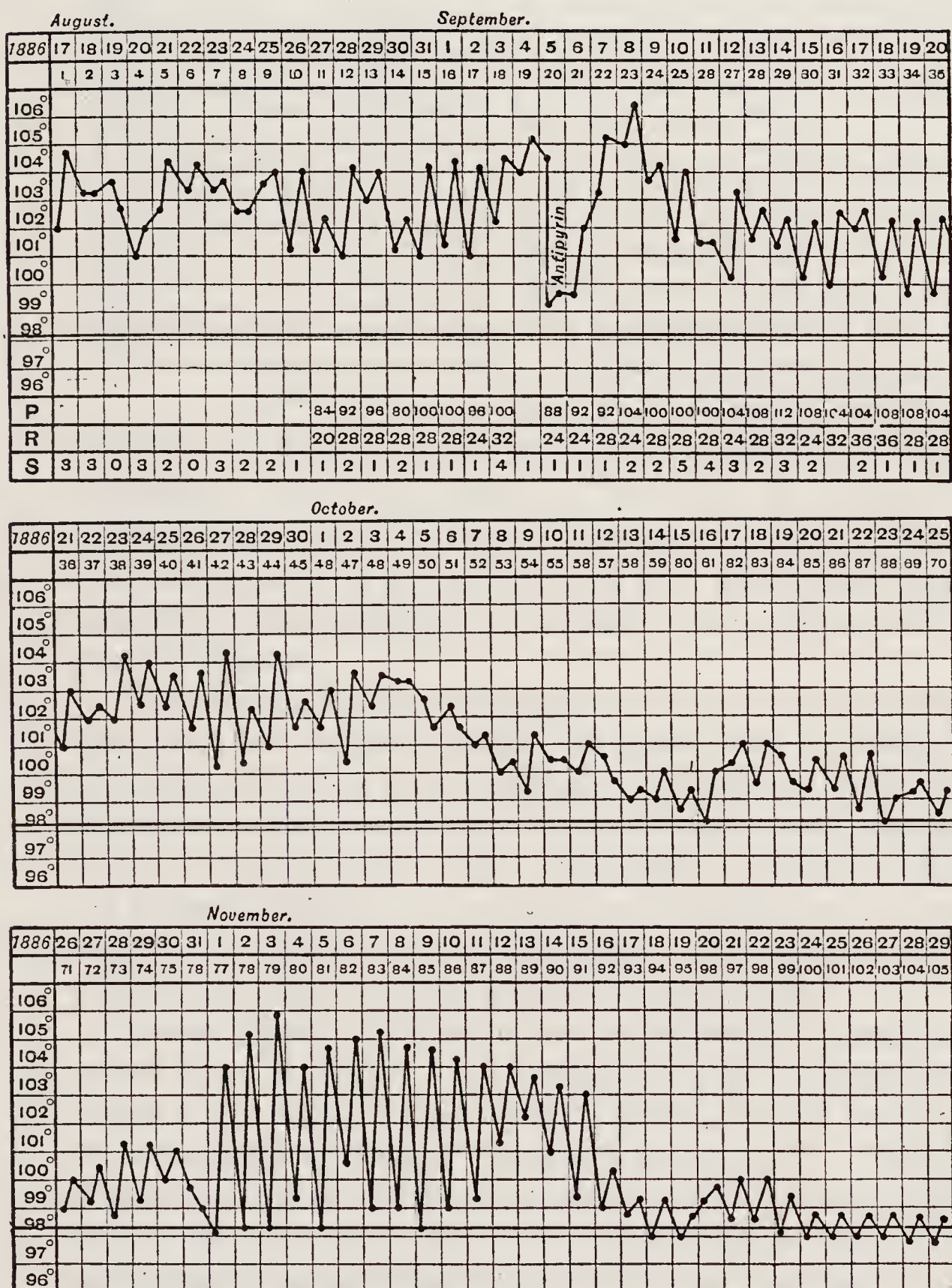


FIG. 34.

On examining this chart it will be seen that the first and second waves are separated by a period, not of apyrexia, but merely of

lowered temperature, and that between the second and third waves the temperature is also above the normal line except at a few points.

The third wave, from the seventy-seventh to the eighty-seventh day, is interesting, as being a well-marked example of the temperature assuming the intermittent type, which, as mentioned above, sometimes occurs in this fever, the temperature at 8 A.M. being normal, whereas at 2 P.M. it has risen to 105° F., and even on one day to $105^{\circ}8$ F.

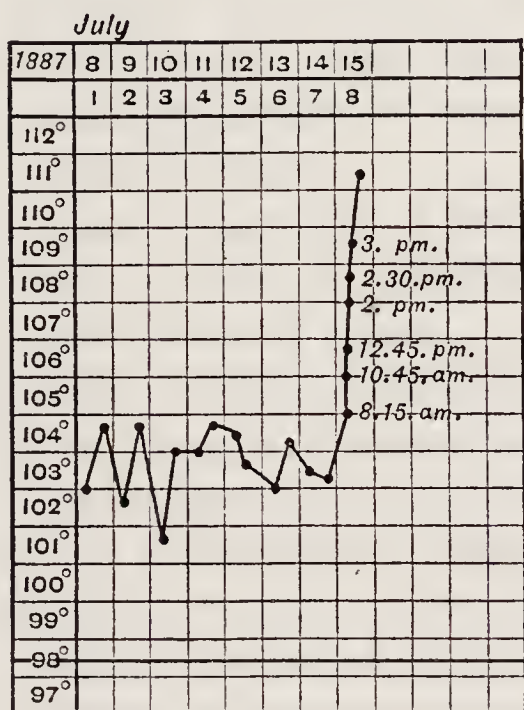


FIG. 35.

In fatal cases the temperature usually runs up rapidly shortly before death, reaching 110° F., or, as is illustrated by the accompanying chart (Fig. 35), as high as $111^{\circ}5$ F.

Genito - Urinary System.—One of the most painful complications in this fever is orchitis; but fortunately this is not of very common occurrence, and usually after a few days the inflammation and swelling of the testicle passes away without further untoward result. Albumen appears in the urine in the most severe cases; but this is a somewhat rare occurrence. Retention may occur, and must be guarded against.

Tegumentary System.—Perspiration is one of the characteristic symptoms of this fever, hence the name *febris sudoralis*. In about one-half of the cases it may be said to be profuse. Crops of furunculi sometimes occur towards the end of the disease, and purpuric patches may be noted in severe cases. Sudamina in greater or less number are almost invariable, but nothing corresponding to the rose-coloured eruption of typhoid fever is met with. Towards the conclusion of the fever the hair frequently falls out extensively.

Nervous System.—Delirium occurs, especially at night, in about one-sixth of the cases, and sleeplessness at the beginning of the illness is the rule. I have noted partial loss of memory in cases, and irritability of temper occurs not infrequently. Want of sensation in some parts of the cutaneous surface is sometimes met with, as also the opposite condition of hyperæsthesia. Loss of muscular power, and even paralysis of certain muscles, may occur in rare cases; and this condition may persist for several months. Headache is severe in more than a third of the cases,—usually frontal, next in frequency occipital, and least commonly confined to the vertex.

Pain in the lumbar region is a frequent symptom; and sciatica in one or both nerves occurs in about one-twentieth of the cases.

Pain and Swelling of Joints.—This very important symptom is noted in nearly half the cases. The joints most commonly affected are the shoulders and knees, next in frequency the hips, then the elbows and wrists, and lastly the ankles. The amount of effusion, say into a knee-joint, may be very considerable, but in no case have I seen suppuration occur.

Special Senses.—In about a tenth of the cases dulness of hearing is complained of; and in very rare cases a patient is found who complains of dimness of vision.

Diagnosis.—Malta fever differs clinically from typhoid fever, principally in being of longer duration, in the absence of the characteristic rose-coloured eruption, in constipation being the rule instead of diarrhoea, in the frequent presence of painful articular complications, and, finally, in the much smaller rate of mortality.

But it cannot be denied that many severe cases occur which so closely simulate severe cases of typhoid, that for the first week or two it is impossible to be absolutely sure of their nature, except by post-mortem examination. After such cases have been under observation for several weeks, the clinical differences tend to become more manifest, and there is usually then no difficulty in separating the one from the other.

Pathological Anatomy.—As would be expected, the changes found are those due to high temperature and some irritating property in the blood. On making a section through a Peyer's patch, and examining it under a low power, the serous, muscular, submucous, and mucous layers are found to be unthickened, and almost normal in appearance. The epithelial layer is continuous over the surface of the gland. Under a high power, morbid changes are found restricted to the mucous and submucous layers, and consist in a slight proliferation of the cellular elements. On examining the large endothelioid plates of the glandular tissue they are seen to be somewhat swollen and proliferating, and there is a slight proliferation of the adenoid tissue. The mesenteric glands are only slightly enlarged; there is proliferation of the cellular elements of the lymphoid tissue; the reticulum is very delicate, and appears in places to be almost obliterated by the increase in the number of the cells; there is some proliferation of the endothelioid plates, and they are in a condition of cloudy swelling. The spleen weighs on an average 18 oz., and is soft and diffuent; the Malpighian bodies are enlarged from an apparent increase in the number of the round lymphoid cells; the endothelioid plates of the marginal sinuses are proliferating and

swollen; a condition of intense congestion is seen in the section, the sinuses being enormously distended with blood; there is a marked exudation of small round cells along the lines of most of the venules. The liver is congested, the cells in a condition of cloudy swelling, and there is an infiltration of small round cells in the interlobular fissures. The kidneys are also congested, and in a condition of glomerular nephritis.

Treatment.—*Prophylactic.*—Those who find it convenient to spend the hot and unhealthy season away from the Mediterranean, in more temperate climates, should do so. Failing this, a partial migration from the over-crowded cities to the neighbouring country may be recommended. The many, who can do neither, should carefully examine the sanitary state of their dwellings before the hot weather sets in. The house drains should be tested for leakage, seen that they are properly trapped, and kept thoroughly flushed. The water supply should also be looked to. Everything liable to decompose in the house or surroundings should be burnt or otherwise disposed of. Care should be taken to avoid over-crowding of sleeping apartments, and that nothing prevents their being flushed with fresh air and sunshine at suitable hours. Personal health should be attended to, since over-fatigue of mind or body, intemperance, exposure to chills, etc., strongly predispose to the disease.

Therapeutic.—It may be stated at the outset that there is no specific medicinal treatment known for combating this fever, and that the majority of the cases are best treated by leaving out drugs as much as possible.

On account of the name remittent fever being commonly associated with this disease, most medical men at first treat it by giving large doses of quinine. As the result of many observations on the action of this drug in Malta fever, I can assert that quinine has absolutely no beneficial influence whatever, and if pushed, as is too often the case, is deleterious.

There is also a great temptation, on account of the frequency of joint complications, to use salicylic acid and the salicylates; but experience soon shows that these drugs are also quite useless.

In this disease, as in many others, the therapeutic treatment must still remain in the unsatisfactory position of treating symptoms as they arise. High temperature is one of the most important of these, and one of the most difficult to treat. Antipyrin, given to the extent of 60 or 90 grains in two or three doses, at intervals of an hour, causes a fall of temperature of many degrees in a few hours; but the return rise is just as remarkable for its rapidity, and I have never seen any real benefit accrue from its use.

The application of cold is probably the best method of combating this symptom; but, to be of any use, this therapeutic means must be carried out thoroughly. Cold sponging and the wet pack may be useful in moderate cases; but to save life when hyperpyrexia threatens to supervene, immersion of the body in the cold bath is necessary. This may require to be repeated for some days, every three or four hours, night and day, and is a method of treatment difficult to carry out thoroughly. The patient is placed at first in water at a temperature of 80° or 85° F., and this is then cooled down some 15° or 20° by placing ice in the water. At the same time, a quantity of cold water may be dashed over the patient's head from time to time. Ten minutes is about the usual time required for each immersion, during which time a little brandy should be given. The temperature in the rectum must be taken every hour, and the bath repeated as soon as the body heat tends to rise above 103° .

Sleeplessness is another symptom which may require to be treated at the beginning of the illness. As a rule, this soon passes off; but a full dose of antipyrin, or chloral with bromide of potassium, may sometimes be found useful. Headache also usually disappears for a time shortly after the administration of antipyrin; and the same drug may be tried if the lumbar pain presses for treatment.

The painful affection of the joints is best treated by local applications, such as painting with iodine, or gently rubbing with one of the ordinary liniments; and for the sake of protection the joint should be enveloped in cotton wool. The orchitic complication is relieved by hot fomentations, to which belladonna or opium may be added, and by the careful support of the inflamed testicle. Constipation is best relieved by enemata, or by some simple aperient, such as castor oil.

Dietetic.—As there is a great tendency to gastric irritability in this disease, every care should be taken regarding the diet. During the first days of the fever, milk alone will be found best, then beef or chicken tea may be added. Raw eggs beaten up in milk are also well borne. In many cases the addition of stimulants will be found necessary. I would specially mention at this point, that as this diet of milk, beef-tea, eggs, and brandy may require to be continued for several weeks, it is most essential that lemonade made from fresh lemons or lime juice be added to prevent the occurrence of scorbutic symptoms. After the acute stage of the fever has passed, the monotony of the diet should be varied as much as possible, by giving part of the milk in the form of rice pudding or custard. There can be no hard and fast rule as to when mild solid food, such

as fish or chicken, may be given, each case must be judged for itself; but the transition should be gradual, and not till the temperature has fairly come down to the normal, and remained there for a fortnight, should the patient be promoted to ordinary diet.

Change of Climate.—Finally, the question of the benefit of a change of climate to England may be touched upon. I do not hold, as many do, that it is as necessary to get patients out of the infective area of Malta fever as in the case of malaria. I rather look on Malta fever and typhoid as being similar in this respect, and that patients will throw off the disease and recover perfectly without leaving the island. By saying this, I do not wish in the least to disparage the benefit of change of climate which common experience proves to be so great; but to combat the exaggerated notion which prevails among many, that every effort must be made to hurry their fever cases out of the island.

On account of this mistaken idea, many invalids are sent to England while still suffering from the fever, and in an extremely debilitated condition, to bear the misery of a sea voyage, and to pass the long period of convalescence exposed to the vicissitudes of an English winter, when the climatic conditions of Malta are just becoming favourable.

